Scalable Architectures for Distributed Beam-Forming Synthetic Aperture Radar (DBSAR), Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Conventional SAR operates in the Stripmap mode. Wide unambiguous swath coverage and high azimuth resolution pose contradictory requirements on the design of SAR systems. A promising technique to overcome this limitation is Digital Beam-Forming (DBF) on receive where the receiving antenna is split into multiple sub-apertures. This provides the capability of forming multiple beams via post-processing. DBF techniques applied to SAR systems can increase receiving antenna gain without a reduction of the imaged area and suppress interference signals. A highly capable DBSAR instrument design would consist of wideband Transmitter-Receiver Module (TRM), precise multi-channel timing and synchronization and reconfigurable processing engine that can host the SAR processing, calibration and control routines. IAI's proposed approach is modular, scalable and meets the NASA goals of developing an innovative analog/digital hardware design for the implementation of distributed DBSAR architectures.

Primary U.S. Work Locations and Key Partners
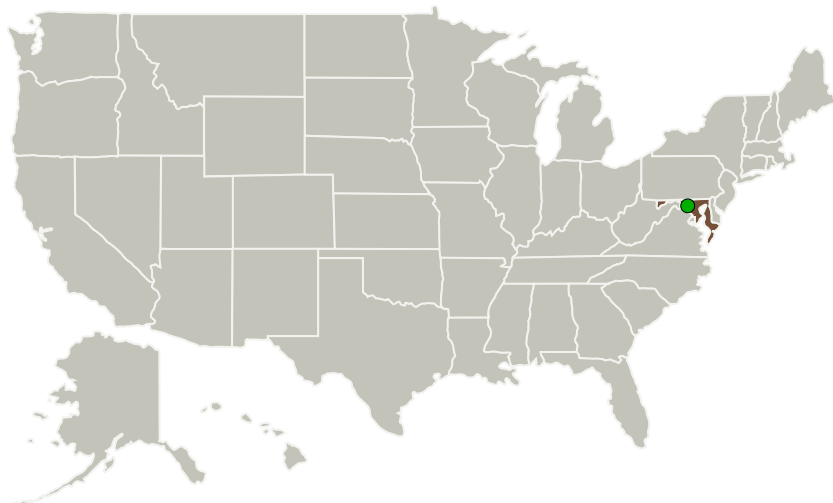
Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
🟢 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

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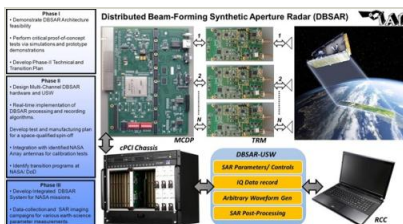
Primary U.S. Work Locations
Maryland

Project Transitions

▶ **June 2015:** Project Start

✔ **December 2015:** Closed out

Closeout Documentation:
- Final Summary Chart*(https://techport.nasa.gov/file/139307)*

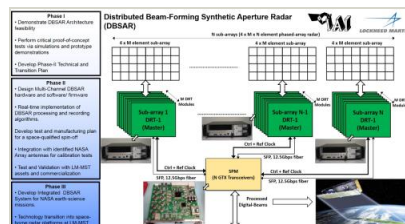## Images

Briefing Chart
Scalable Architectures for Distributed Beam-Forming Synthetic Aperture Radar (DBSAR) Briefing Chart
(https://techport.nasa.gov/image/129852)

Final Summary Chart Image
Scalable Architectures for Distributed Beam-Forming Synthetic Aperture Radar (DBSAR), Phase I Project Image
(https://techport.nasa.gov/image/131017)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Intelligent Automation, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Arvind Bhat

Co-Investigator:
Arvind Bhat

TechPort

Printed on 12/15/2022
06:04 AM UTC

For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/34211

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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

Technology Areas

Primary:

- TX08 Sensors and Instruments
  └ TX08.1 Remote Sensing Instruments/Sensors
    └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System